

**BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA**

DOCKET NO. 2022-1-E

In the Matter of)	DIRECT TESTIMONY
Annual Review of Base Rates for Increase in)	OF BRYAN P. WALSH FOR
Fuel Costs for Duke Energy Progress, LLC)	DUKE ENERGY PROGRESS, LLC

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Bryan P. Walsh, and my business address is 526 South Church Street, Charlotte,
3 North Carolina 28202.

4 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

5 A. I am Vice President of Central Operational Services and Oversight for Duke Energy Business
6 Services, LLC ("DEBS"). DEBS is a service company subsidiary of Duke Energy
7 Corporation ("Duke Energy") that provides services to Duke Energy and its subsidiaries,
8 including Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP" or
9 the "Company").

10 **Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL**
11 **BACKGROUND.**

12 A. I graduated from The Catholic University of America with a Bachelor of Mechanical
13 Engineering degree. I also graduated from the Georgia Institute of Technology with a Master
14 of Science in Mechanical Engineering. I am a registered Professional Engineer in the State
15 of North Carolina. My career began with Duke Energy as part of Duke / Fluor Daniel in 1999
16 as an associate engineer assisting in the design and commissioning of new combined-cycle
17 power plants. I transferred to Duke Power in 2003 and worked in the Technical Services
18 group for Fossil-Hydro. Since that time, I have held various roles of increasing responsibility
19 in the generation engineering, operations areas, and project management, including the role
20 of technical manager at DEC's Marshall Steam Station, and also station manager at Duke
21 Energy Indiana's Gallagher Station & Markland Hydro Station. I was also the Midwest
22 Regional Manager from 2012 to 2015, with overall responsibility for the Midwest Gas
23 Turbine Fleet and various coal-fired facilities in Indiana and Kentucky. During my time in

1 the Midwest, I also served as Chairman of the Indiana Energy Association's Power Production
2 Committee, which brought together Duke Energy and peer utilities Vectren, NIPSCO, AEP
3 and IP&L for operational experience exchanges, along with coordination on common industry
4 issues. I was named General Manager for Outages & Projects in the Carolinas in 2015. Next,
5 I became the General Manager of Fossil-Hydro Organizational Effectiveness in 2017. I
6 assumed my current role in 2019.

7 **Q. WHAT ARE YOUR DUTIES AS VICE PRESIDENT OF CENTRAL**
8 **OPERATIONAL SERVICES AND OVERSIGHT?**

9 A. In this role, I am responsible for providing engineering, environmental compliance planning,
10 technical services, and maintenance services, for Duke Energy's fleet of fossil, hydroelectric,
11 and solar (collectively, "Fossil/Hydro/Solar") facilities.

12 **Q. HAVE YOU TESTIFIED BEFORE THIS COMMISSION IN ANY PRIOR**
13 **PROCEEDINGS?**

14 A. Yes, I testified in DEP's 2018 and 2021 fuel costs proceedings in Docket No. 2018-1-E and
15 Docket No. 2021-1-E. I also testified in DEC's 2021 fuel costs proceeding in Docket No.
16 2021-3-E.

17 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

18 A. The purpose of my testimony is to (1) describe DEP's Fossil/Hydro/Solar generation portfolio
19 and changes made since the 2021 fuel cost recovery proceeding, as well as those expected in
20 the near term; (2) discuss the performance of DEP's Fossil/Hydro/Solar facilities during the
21 period of March 1, 2021 through February 28, 2022 (the "review period"); (3) provide
22 information on significant Fossil/Hydro/Solar outages that occurred during the review period;
23 and (4) provide information concerning environmental compliance efforts.

Q. PLEASE DESCRIBE DEP'S FOSSIL/HYDRO/SOLAR GENERATION PORTFOLIO FOR THE REVIEW PERIOD.

A. The Company's Fossil/Hydro/Solar generation portfolio consists of 8,868 MWs of generating capacity, made up as follows:

Coal-fired -	3,143 MWs
Combustion Turbines -	2,408 MWs
Combined Cycle Turbines -	3,054 MWs
Hydro -	228 MWs
Solar -	35 MWs ¹

The 3,143 MWs of coal-fired generation represent two generating stations and a total of five units. These units are equipped with emission control equipment, including selective catalytic reduction ("SCR") equipment for removing nitrogen oxides ("NO_x"), flue gas desulfurization ("scrubber") equipment for removing sulfur dioxide ("SO₂"), and low NO_x burners. This inventory of coal-fired assets with emission control equipment enhances DEP's ability to maintain current environmental compliance and concurrently utilize coal with increased sulfur content – providing flexibility for DEP to procure the most cost-effective options for fuel supply.

The Company has a total of 24 simple cycle combustion turbine ("CT") units, the larger 14 of which provide 2,148 MWs, or 89% of CT capacity. These 14 units are located at the Asheville, Darlington, Richmond County (Smith Energy Complex), and Wayne County (H.F. Lee) facilities, and are equipped with water injection and/or low NO_x burners for NO_x

¹ This value represents the relative dependable capacity contribution to meeting summer peak demand, based on the Company's integrated resource planning metrics. The nameplate capacity of the Company's solar facilities is 141 MWs.

1 control. The 3,054 MWs shown as “Combined Cycle Turbines” (“CC”) represent six power
2 blocks. The two Asheville Combined Cycle power blocks have a configuration of one CT
3 and one steam turbine. The H.F. Lee Energy Complex CC power block has a configuration
4 of three CTs and one steam turbine. The two Richmond County power blocks located at the
5 Smith Energy Complex consist of two CTs and one steam turbine each. The Sutton Combined
6 Cycle at Sutton Energy Complex consists of two CTs and one steam turbine. The six CC
7 power blocks are equipped with SCR equipment, and all nine CTs have low NO_x burners.
8 The steam turbines do not combust fuel and, therefore, do not require NO_x controls. The
9 Company’s hydro fleet consists of 15 units providing 228 MWs of capacity. The Company’s
10 solar fleet consists of four sites providing 35 MWs of dependable capacity.

11 **Q. WHAT NOTABLE CHANGES HAVE OCCURRED WITHIN THE**
12 **FOSSIL/HYDRO/SOLAR PORTFOLIO SINCE DEP’S 2021 ANNUAL FUEL**
13 **PROCEEDING?**

14 A. There have been no notable changes to the DEP Fossil/Hydro/Solar portfolio since the 2021
15 annual fuel proceeding.

16 **Q. WHAT ARE DEP’S OBJECTIVES IN THE OPERATION OF ITS**
17 **FOSSIL/HYDRO/SOLAR FACILITIES?**

18 A. The primary objective of DEP’s Fossil/Hydro/Solar generation department is to provide safe,
19 reliable, and cost-effective electricity to DEP’s customers. Operations personnel and other
20 station employees are well-trained and execute their responsibilities to the highest standards
21 in accordance with procedures, guidelines, and a standard operating model. Like safety,
22 environmental compliance is a “first principle,” and DEP works very hard to achieve high
23 level results.

1 The Company achieves compliance with all applicable environmental regulations and
2 maintains station equipment and systems in a cost-effective manner to ensure reliability. The
3 Company also takes action in a timely manner to implement work plans and projects that
4 enhance the safety and performance of systems, equipment, and personnel, consistent with
5 providing low-cost power options for DEP's customers. Equipment inspection and
6 maintenance outages are generally scheduled during the spring and fall months when
7 customer demand is reduced due to milder temperatures. These outages are well-planned and
8 executed with the primary purpose of preparing the unit for reliable operation until the next
9 planned outage.

10 **Q. HOW MUCH GENERATION DID EACH TYPE OF GENERATING FACILITY**
11 **PROVIDE FOR THE REVIEW PERIOD?**

12 A. For the review period, DEP's total system generation was 59,718,775 megawatt-hours
13 ("MWHs"), of which 30,104,057 MWHs, or approximately 50%, was provided by the
14 Fossil/Hydro/Solar fleet. The breakdown includes a 38% contribution from gas facilities,
15 11% contribution from coal-fired stations, 1% contribution from hydro sources, and 0.4%
16 from solar facilities.

17 **Q. HOW DID DEP COST EFFECTIVELY DISPATCH THE DIVERSE MIX OF**
18 **GENERATING UNITS DURING THE REVIEW PERIOD?**

19 A. The Company's portfolio includes a diverse mix of units that, along with its nuclear capacity,
20 allows DEP to meet the dynamics of customer load requirements in a logical and cost-
21 effective manner. The addition of new CC units within the Carolinas' portfolio in recent years
22 has provided DEP with additional natural gas resources that feature state-of-the-art
23 technology for increased efficiency and significantly reduced emissions. DEP also uses the

1 Joint Dispatch Agreement with DEC, which allows generating resources for DEP and DEC
2 to be dispatched as a single system to enhance dispatching the lowest cost resources available.
3 The cost and operational characteristics of each unit generally determine the type of customer
4 load situation (e.g., base and peak load requirements) that a unit would be called upon or
5 dispatched to support.

6 **Q. WHAT WAS THE HEAT RATE FOR DEP'S COAL-FIRED AND COMBINED**
7 **CYCLE UNITS DURING THE REVIEW PERIOD?**

8 A. Heat rate is a measure of the amount of thermal energy needed to generate a given amount of
9 electric energy and is expressed as British thermal units ("Btu") per kilowatt-hour ("kWh").
10 A low heat rate indicates an efficient fleet that uses less heat energy from fuel to generate
11 electrical energy. Over the review period, the Company's five coal units produced 22% of
12 the Fossil/Hydro/Solar generation, with the average heat rate for the coal-fired units being
13 11,287 Btu/kWh. The most active station during this period was Roxboro, providing 85% of
14 the coal production for the fleet with an average heat rate of 11,061 Btu/kWh. During the
15 review period, the Company's six combined cycle power blocks produced 69% of the
16 Fossil/Hydro/Solar generation, with an average heat rate of 7,165 Btu/kWh.

17 **Q. PLEASE DISCUSS THE OPERATIONAL RESULTS FOR DEP'S**
18 **FOSSIL/HYDRO/SOLAR FLEET DURING THE REVIEW PERIOD.**

19 A. The Company's generating units operated efficiently and reliably during the review period.
20 Several key measures are used to evaluate the operational performance depending on the
21 generator type: (1) equivalent availability factor ("EAF"), which refers to the percent of a
22 given time period a facility was available to operate at full power, if needed (EAF is not
23 affected by the manner in which the unit is dispatched or by the system demands; it is

1 impacted, however, by planned and unplanned maintenance (*i.e.*, forced) outage time); (2) net
2 capacity factor (“NCF”), which measures the generation that a facility actually produces
3 against the amount of generation that theoretically could be produced in a given time period,
4 based upon its maximum dependable capacity (NCF *is* affected by the dispatch of the unit to
5 serve customer needs); (3) equivalent forced outage rate (“EFOR”), which represents the
6 percentage of unit failure (unplanned outage hours and equivalent unplanned derated hours);
7 a low EFOR represents fewer unplanned outage and derated hours, which equates to a higher
8 reliability measure; (4) starting reliability (“SR”), which represents the percentage of
9 successful starts; and (5) equivalent forced outage factor (“EFOF”) – which quantifies the
10 number of period hours in a year during which the unit is unavailable because of forced
11 outages and forced deratings.

12 The following chart provides operational results categorized by generator type, as well
13 as results from the most recently published North American Electric Reliability Council
14 (“NERC”) Generating Unit Statistical Brochure representing the period 2016 through 2020.
15 The NERC data reported for the coal-fired units represents an average of comparable units
16 based on capacity rating.

Generator Type	Measure	Review Period	2016-2020	Nbr of Units
		DEP Operational Results	NERC Average	
<i>Coal Fired Test Period</i>	EAF	64.8%	79.8%	250
	NCF	23.4%	53.2%	
	EFOR	21.0%	8.8%	
	EFOF	9.1%	n/a	
<i>Coal Fired Summer Peak</i>	EAF	78.5%	n/a	n/a
<i>Total CC Average</i>	EAF	79.4%	84.9%	345
	NCF	65.8%	54.3%	
	EFOR	1.6%	5.0%	
	EFOF	1.3%	n/a	
<i>Total CT Average</i>	EAF	83.9%	86.6%	709
	SR	99.2%	98.5%	
<i>Hydro</i>	EAF	77.7%	79.4%	1059

Q. PLEASE DISCUSS SIGNIFICANT OUTAGES OCCURRING AT DEP'S FOSSIL/HYDRO/SOLAR FACILITIES DURING THE REVIEW PERIOD.

A. In general, planned maintenance outages for all fossil and hydro units are scheduled for the spring and fall to maximize unit availability during periods of peak demand. Most units had at least one short planned outage during this review period to inspect and maintain plant equipment.

In the first half of the review period, Richmond County CT Unit 1 held an outage to perform advance gas path peaker upgrades and exhaust frame replacement. Lee CC 1A performed an outage to perform a major inspection on the gas turbines, steam turbine valve rebuilds with inspections, and minor Balance of Plant ("BOP") maintenance. Roxboro 4 performed an outage to complete an economizer hopper replacement, rebuild stop valves, and complete a boiler inspection and Mercury and Air Toxics Standards ("MATS") inspection. Mayo 1 had outages for transmission work to be performed in the switchyard and to repair

1 surge bin chutes. Sutton CC had an outage to perform a borescope inspection, drain valve
2 replacements, generator inspections, boiler feed water pump replacement, and CT transition
3 expansion joint replacement.

4 In the second half of the review period, Richmond County CC had an outage to
5 perform gas turbine inspections, cooling tower upper half rebuild, steam turbine valve interval
6 inspection/repairs, and BOP safety valve inspection/repairs. Roxboro 1 had an outage to
7 replace burners, batteries, and the air heater outlet expansion joint. Roxboro 2 had an outage
8 to complete fan replacement and high energy piping (“HEP”) inspections. Mayo 1 had an
9 outage to replace four absorber agitators, perform inspection of the absorber tower, and
10 conduct back end duct repairs. Roxboro 3 had an outage to perform SCR screen replacement,
11 HEP inspections, and absorber agitator replacement. Roxboro 4 had an outage to perform
12 precipitator repairs, span breaker removal, and an air heater inspection.

13 **Q. HOW DOES DEP ENSURE EMISSIONS REDUCTIONS FOR ENVIRONMENTAL**
14 **COMPLIANCE?**

15 A. The Company has installed pollution control equipment on coal-fired units, as well as new
16 generation resources, in order to meet various current federal, state, and local reduction
17 requirements for NO_x and SO₂ emissions. The SCR technology that DEP currently operates
18 on the coal-fired units uses ammonia or urea for NO_x removal and the scrubber technology
19 employed uses crushed limestone or lime for SO₂ removal. SCR equipment is also an integral
20 part of the design of the newer CC facilities in which aqueous ammonia (19% solution of
21 NH₃) is introduced for NO_x removal.

22 Overall, the type and quantity of chemicals used to reduce emissions at the plants
23 varies depending on the generation output of the unit, the chemical constituents in the fuel

1 burned, and/or the level of emissions reduction required. The Company is managing the
2 impacts, favorable or unfavorable, as a result of changes to the fuel mix and/or changes in
3 coal burn and utilization of non-traditional coals. Overall, the goal is to effectively comply
4 with emissions regulations and provide the optimal total-cost solution for operation of the
5 unit. The Company will continue to leverage new technologies and chemicals to meet both
6 present and future state and federal emissions requirements including the MATS rule. MATS
7 chemicals that DEP may use in the future to reduce emissions include, but may not be limited
8 to, activated carbon, mercury oxidation chemicals, and mercury re-emission prevention
9 chemicals. Company witness Harrington provides the cost information for DEP's chemical
10 use and forecast.

11 **Q. DOES THAT CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

12 **A.** Yes, it does.